RAFTELIS
FINANCIAL CONSULTANTS, INC.

WOODCOCK & ASSOCIATES, INC.
Utility Rates & Finance

CITY OF NORTHAMPTON

WATER AND SEWER RATE STUDY

Fiscal Year 2017 - Final Report

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Introduction

Raftelis Financial Consultants, Inc. (RFC) and Woodcock & Associates, Inc. (W-A), together RFC/W-A, are pleased to submit this report summarizing the assumptions and findings of our Water and Sewer Rate Study (Study) performed for the City of Northampton (City). Over the past several months, RFC/W-A have worked closely with the City completing this engagement. We would like to take this opportunity to thank Mayor David J. Narkewicz and his staff for their tireless efforts and participation throughout the duration of the Study.

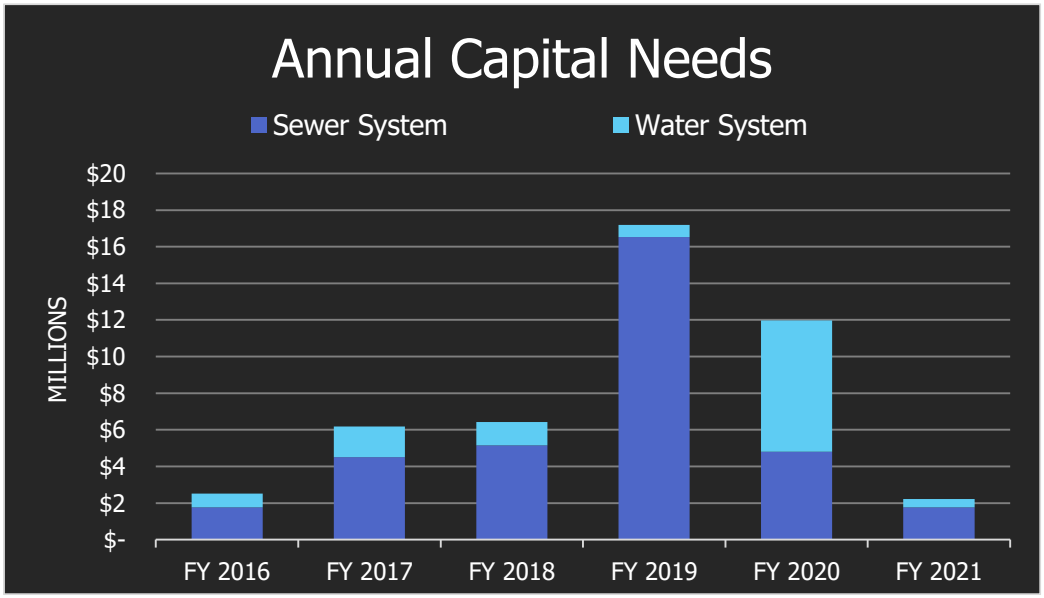
In the spring of 2015, Mayor Narkewicz, after receiving important feedback from the citizens of Northampton with regard to water and sewer rates, recommended to hold FY 2016 rates at FY 2015 levels in order to allow for additional time to review the very important concepts surrounding water and sewer rates. Specifically, Mayor Narkewicz was interested in pursuing research on alternative rate structures, conservation incentives, and low-income rate relief. This recommended temporary freeze in rates also allowed for the City's Department of Public Works (DPW) to finalize its Comprehensive Waste Water Management Plan and Water Supply System Assessment Management Plan.

RFC/W-A were approached by the City in the summer of 2015 to perform a comprehensive Water and Sewer Rate Study. The main goals of this Study were to assess the appropriateness of the City's current water and sewer rate structures in comparison to Northampton's rate structure objectives and to develop a forecast of water and sewer rates to fund current and future operating and capital needs. The City requested that RFC/W-A take a comprehensive and fresh look at its current rate structures, leaving no options off of the table for consideration.

Financial Plan Overview

RFC/W-A worked closely with the City to build a forecast of operating expenses, capital expenditures, and necessary funding sources. A mixture of rate increases, new debt service, and reserve balances were analysed to determine the best funding sources to meet the annual cash needs and to moderate the impacts on the City's customers. The City's need for future rate increases is due, primarily, to capital expenditures, more specifically with regard to wastewater treatment plant upgrades. Chart 1 below outlines a 5-year forecast of annual capital needs for the water and wastewater utilities.

Chart 1: Annual Capital Expenditures (FY 2016 – FY 2021)



As noted earlier, these capital expenditures will be funded through a mixture of rate increases (PAYGO), reserve fund balances, and new debt issuances. RFC/W-A balanced these funding mechanisms in order to mitigate impacts on customers and to ensure adequate reserve fund balances to stabilize the need for future rate increases and safeguard against financial instability.

The following Charts, 2 and 3, outline the five-year financial plan for both the water and wastewater utilities. The revenue in these charts assume 2 percent annual water rate increases and 3 percent annual sewer rate increases beginning in FY 2017.

Chart 2: Water Financial Plan (FY 2016 – FY 2021)

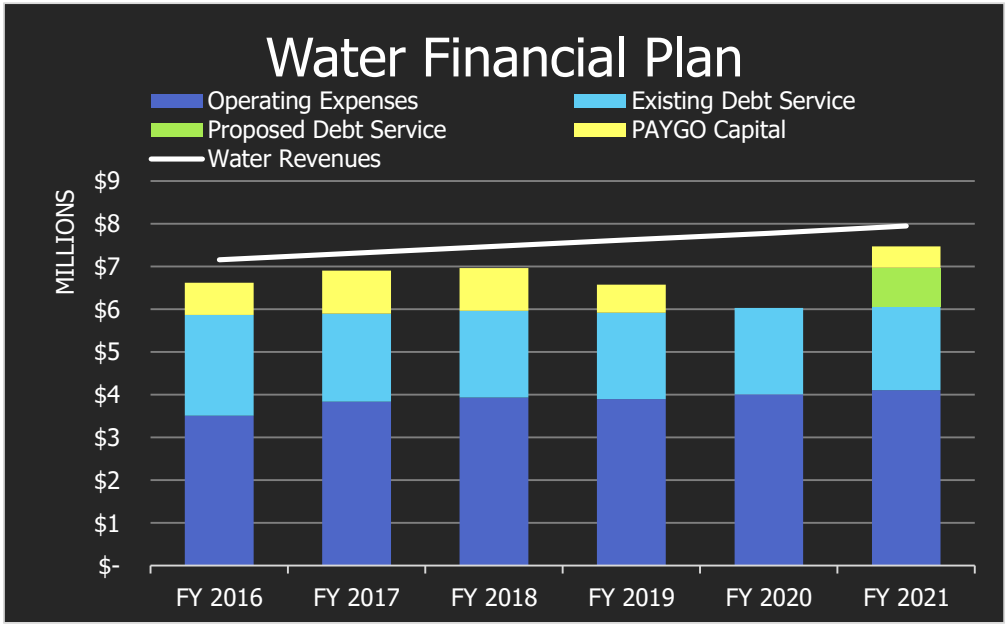
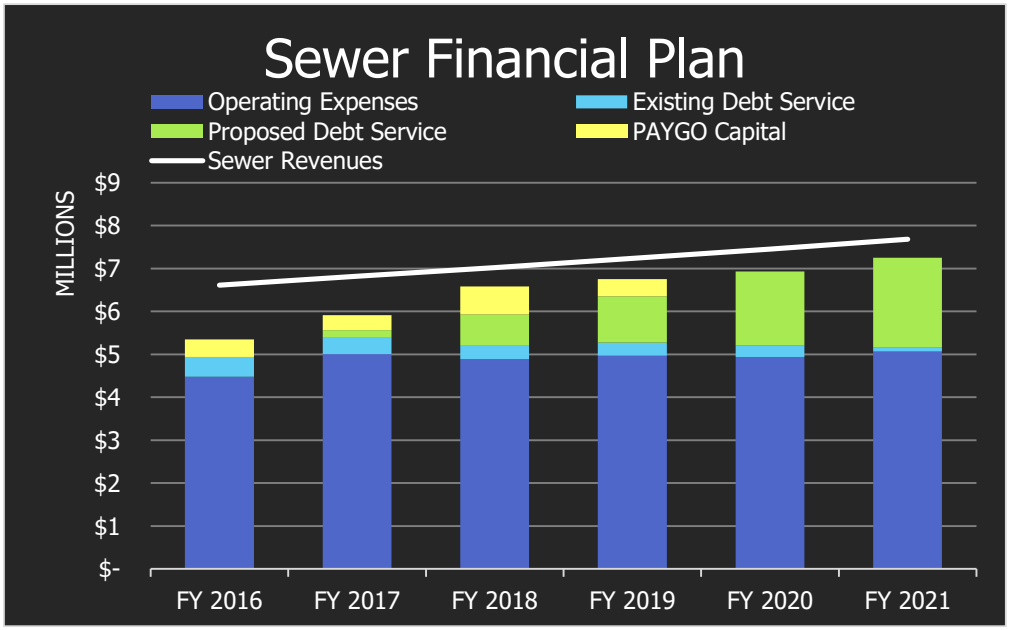


Chart 3: Sewer Financial Plan (FY 2016 – FY 2021)



Existing Rate Structures

The first step in developing new water and sewer rate structures for the City was to evaluate the City's existing rate structure. Currently, all customers are charged the same volumetric rate per one-hundred cubic feet (Ccf), or approximately 748 gallons, of water, regardless of the amount of water used, the type of customer, or the size of the customer's meter connection. All customers are charged for sewer services based on 100% of metered water consumption, except for five large industrial customers[1]. A minimal fixed charge is also assessed per bill, which is escalated by meter size. Tables 1 and 2 present the City's existing water and sewer rate structures, respectively.

Table 1: Existing Water Rates

Current Rates	FY 2016
Volumetric – All Customers (per Ccf)	
All Consumption	$ 5.58
Quarterly Fixed Charge	
5/8"	$ 1.00
3/4"	1.25
1"	1.75
1.5"	3.00
2"	5.00
3"	10.00
4"	15.00
6"	30.00
8"	50.00

[1] Coca Cola, Packaging Corporation of America (PCA), Cooley Dickinson Hospital. L3KEO, and Florence Casket Company. These customers use water in their products and discharge wastewater volumes that are significantly less than the water supplied, and are charged for sewer service based on individual sewer meter measurements.

Table 2: Existing Sewer Rates

Current Rates	FY 2016
Volumetric – All Customers (per Ccf)	
All Consumption	$ 6.08

In order to assess the appropriateness of the City's current rate structure, and if necessary design and develop a new rate structure tailored specifically for the City, we held meetings with the City in order to gain a firm understanding of the most important objectives that the City's new water and sewer rate structures should meet. After discussions, it was determined that the City's key rate objectives, in no particular order, were to promote conservation, provide assistance to economically disadvantaged customers, improve equity among customer types, and enhance revenue stability.

Although the City's existing rate structure generates sufficient revenues to adequately provide for current financial sufficiency, it does not accomplish all of the aforementioned rate objectives. Specifically, having a uniform rate for all water consumption does very little to promote conservation. Given the potential for fluctuations in revenue due to having a heavily volumetric rate structure (currently the City's revenue stream is approximately 99% volumetric), the City's current rate structure is not very revenue stable. For example, weather variations can heavily influence customer's demand for water, which in turn can greatly fluctuate the amount of revenue a utility recovers. Increasing the percentage of revenue the City recovers through fixed charges will help mitigate the volatility of revenues by enhancing revenue stability.

Analysed Options for New Rate Structures

Given that the City directed RFC/W-A to exhaust all relevant options with regard to determining the best rate structure for Northampton, we analysed the following options that would sufficiently meet the rate objectives outlined in the prior section:

- Seasonal Rates
- Inclining Block Water Rates
- Fixed Charges
- Second Meter Policies
- Sewer Rate Assessment Methodology
- Private Fire Protection Charges

Seasonal Rates

Seasonal rates charge customers volumetric rates, which differ based on the season. Relative to uniform structures, seasonal rate structures provide a greater conservation incentive during the summer season by charging more for service when demands and costs are highest. Although seasonal rate structures can help achieve the goal of conservation, they generally require monthly

billing in order to appropriately and equitably assess the higher summer charges during the same periods of time for all customers. Due to the fact that the City currently bills quarterly, and in staggered intervals, the effective use of seasonal rates is not feasible. Should the City convert to monthly billing in the future, this type of rate structure should absolutely be considered, assuming conservation is still an objective of the City.

Inclining Block Water Rates

Inclining block rates charge volumetric rates, but the charge per unit of water increases as consumption increases. Inclining block rates, when calculated correctly, can address conservation needs by charging more for non-essential water usage. Also, depending on the behaviour of individual customers, inclining block rates may provide a great degree of affordability for essential usage than if uniform rates were charged. Due to these reasons, RFC/W-A recommend that the City implement a form of increasing block rate structure. The specifics of this rate structure will be discussed in a later section.

It should be noted that our analysis of increasing block rate structures included a number of variations. Whenever considering the implementation or revision of an increasing block rate structure, one must at a very minimum also consider the appropriate number of blocks within the structure as well as the consumption level in which the block should change. An alternative we considered involved an examination of the number of persons per household and setting different blocks or steps for various household sizes. The administration of such a program would be an added cost to the City and add complexity to the billing process. The City would need to continuously monitor and revise household sizes for each bill. Another variant considered blocks based on each customer's winter period water use. It was believed that this variation would also be costly and difficult to administer, particularly with quarterly billing.

It was also determined that the increasing block structure would only be applied to customers with smaller meters (5/8", ¾", and 1"), mostly comprised of single-family residential homes and small commercial businesses. The overwhelming heterogeneity of customer characteristics within groupings of customers with larger meters prohibits a fair and defensible methodology for establishing block cut-offs for those customers groupings.

Fixed Charges

Fixed charges are designed to recover a portion fixed cost components that are independent of costs directly related to either the production and delivery of water or the collection and treatment of wastewater. These fixed costs may include some or all of the following items:

- Meter reading, billing, collection, customer service, etc.;
- Meter maintenance, repair, and replacement costs;
- Some portion of fixed capital costs such as debt service and other capital-related costs; and
- In some cases, fixed operation and maintenance costs.

As described in a prior section, fixed charges ensure that a portion of revenues are collected in a steady pattern regardless of seasonal changes in consumption. Since one of the City's objectives was to increase its revenue stability, RFC/W-A recommend that the City cover a greater amount of fixed costs through its quarterly fixed charge than it is currently charging. Again, the specifics of the recommended rate structure will be discussed in a latter section.

Second Meter Policies

For irrigation purposes, and to reflect metered water that is not returned to the sewer system, some utilities will allow its customers to install second irrigation meters, where a separate irrigation or second-meter rate would only be charged for metered water usage through that meter, and no sewer charge. The City has made a policy decision to not allow second meters for administrative reasons. Due to the fact that the City does have a few large customers who have separate sewer meters, metering the exact measurement of water being returned to the sewer system, RFC/W-A recommends that the City reassess the methodology in which it charges for sewer services.

Sewer Rate Assessment Methodology

In order to provide equity among customers which have separate sewer meters and those which do not, RFC/W-A recommend assessing volumetric sewer rates on 80% of metered water consumption, rather than 100%, to reflect the estimated portion of a customer's water consumption which is not returned to the sewer system. Given that there are only five large customers within the City which have separate sewer meters, monitoring the exact flow of wastewater leaving a property, which for these customers is usually something much less than 80% of metered water consumption coming into the property, RFC/W-A recommend instituting the 80% of metered water flow policy to provide a greater level of equity among all customers.

Private Fire Protection Charges

The City does not currently charge customers for providing the capacity for private fire protection services. The City, through private fire protection, provides on-going service to those with private connections to the system. This is a service that is only provided to some customers. The cost of providing the continued water capacity needed in the event of a fire, while at the same time maintaining the service lines and infrastructure is not a costless exercise for the City. Hence, RFC/W-A recommend that the City begin charging for private fire protection services.

Recommended New Rate Structures and Programs

After analysing the aforementioned options, and discussing with the City, RFC/W-A recommend the following new water and sewer rate structures and rate components be implemented:

- Create 2 separate volumetric water rates based on meter size
    - Small – 5/8", ¾", and 1" connections (single-family residential homes and small commercial businesses)

    - Large – 1.5” connections and above
- Implement two-tier inclining block water rates for Small customers
- Increase the City’s current quarterly fixed charge to cover a greater amount of fixed costs
- Implement private fire protection charges
- Charge sewer rate based on 80% of metered water consumption for those customers which do not have a separate sewer meter

Table 3: Recommended Water Rates

Recommended Rates	FY 2017
Volumetric - Small (per Ccf)	
Tier 1: 0 - 16 Ccf	$ 4.73
Tier 2: > 16 Ccf	6.21
Volumetric - Large (per Ccf)	
All Consumption	$ 6.09
Quarterly Fixed Charge	
5/8"	$ 12.64
3/4"	18.96
1"	31.59
1.5"	63.17
2"	101.07
3"	189.51
4"	315.85
6"	631.69
8"	1,010.69

It should be noted that the tier cut-off for the Small volumetric rates was determined by taking the Commonwealth’s standard for efficient water used of 65 gallons per day per person for approximately 90 days and assuming 2.05 persons per household based on U.S. Census data for the City. All consumption above 16 Ccf per quarter, which is approximately 12,000 gallons, would be considered non-efficient and charged at the higher rate. We understand that not all small households within the City have 2.05 persons per household, but for reasons outlined in the prior section regarding our analysed options, we felt that this was the most reasonable methodology for setting the block cut-off given the resources available.

Also of note, the City’s current quarterly fixed charge generates only 0.5% of the City’s water and sewer revenues. In order to begin increasing revenue stability, one of the City’s rate objectives, we have increased this quarterly fixed charge to recover 2% of the City’s water and sewer revenues. It is recommended that as able to, the City should continue increasing this percentage in order to create and sustain an even greater level of revenue stability.

Table 4 presents the recommended private fire protection charges. The cost of providing this service is dependent on the size of the customer’s connection and thus the rate or volume of water that can be provided for firefighting. The recommended charges are based on engineering hydraulic equations that are based on the nominal size of the connections.

Table 4: Recommended Fire Protection Charges

Recommended Rates (Quarterly)	FY 2017
Fire Line Diameter	
< 2"	$ 0.00
2"	10.00
3"	25.00
4"	60.00
6"	170.00
8"	360.00
10"	645.00

Table 5 presents the recommended sewer rates. As we discussed earlier, these are rates that are based on the estimated volume of wastewater discharge, not simply the metered water demands. For customers with separate sewer meters, the rates are based on the metered wastewater discharge. For customers that do not have sewer meters, we have estimated that the wastewater discharge from typical properties in Northampton is approximately 80% of the metered *water* use. We recommend that the sewer charges for these customers be based on 80% of their metered water consumption.

Table 5: Recommended Sewer Rates

Recommended Rates	FY 2017
Volumetric – All Sizes (per Ccf)	
All Consumption	$ 7.52

Customer Impacts

In order to assess the effect of the recommended rates on the City's customers, we have calculated and prepared customer impact schedules for various customers with regard to meter size and consumption amount. These impacts have been broken down into water only, sewer only, and combined impacts, which can be viewed in Tables 6, 7, and 8, respectively. It should be noted that for purposes of honing on a specific impact, RFC/W-A has highlighted a Small customer using 12 Ccf, or approximately 9,000 gallons a quarter, which represents the typical customer within the City. For this typical customer, the net effect of changing the rate structures, along with increasing the rates necessary to fund FY 2017's revenue requirements, is an increase of $0.67 per quarter, or $2.68 annually.

Due to the fact that the City was also interested in assuring that an essential service such as water and sewer service is affordable for economically disadvantaged customers, RFC/W-A have also recommended a program to go alongside the recommended water and sewer rates. Given that the increased quarterly fixed charge is the only portion of a customer's bill which is fixed, and hence cannot be reduced through conservation, we have recommended providing exemptions of the quarterly fixed charge of $12.64 for those City customers who are currently eligible for Real Estate and CPA exemptions. For customers eligible to take advantage of this program, the following

charts also show the quarterly impact given the fixed charge exemption. As a point of reference, using the same typical customer, rather than seeing a quarterly increase of $0.67, a typical customer eligible for the exemption would experience a reduction of $8.92per quarter, or $35.68 annually compared to what they are currently paying for water and sewer service.

Table 6: Water Only Customer Impacts (Quarterly Bill Comparison)

Ccf	Size	Current	Preliminary	$ Change	Preliminary (w/ income discount)	$ Change (w/ income discount)
3	5/8"	$ 17.74	$ 26.83	$ 9.09	$ 32.24	$ (3.74)
6	5/8"	$ 34.48	$ 41.02	$ 6.54	$ 64.48	$ (6.48)
9	5/8"	$ 51.22	$ 55.21	$ 3.99	$ 96.71	$ (9.23)
12	5/8"	$ 67.96	$ 69.40	$ 1.44	$ 128.95	$ (11.97)
15	5/8"	$ 84.70	$ 83.59	$ (1.11)	$ 161.19	$ (14.71)
20	5/8"	$ 112.60	$ 113.14	$ 0.54	$ 220.82	$ (13.38)
50	1"	$ 280.75	$ 318.27	$ 37.52	N/A	N/A
200	2"	$ 1,121.00	$ 1,319.47	$ 198.47	N/A	N/A
500	3"	$ 2,800.00	$ 3,235.51	$ 435.51	N/A	N/A
1,000	4"	$ 5,595.00	$ 6,407.87	$ 812.87	N/A	N/A
2,000	6"	$ 11,190.00	$ 12,815.74	$ 1,625.74	N/A	N/A

Table 7: Sewer Only Customer Impacts (Quarterly Bill Comparison)

Ccf	80% of Ccf	Size	Current	Proposed	$ Change
3	2.4	5/8"	$ 18.24	$ 18.05	$ (0.19)
6	4.8	5/8"	$ 36.48	$ 36.10	$ (0.38)
9	7.2	5/8"	$ 54.72	$ 54.14	$ (0.58)
12	9.6	5/8"	$ 72.96	$ 72.19	$ (0.77)
15	12	5/8"	$ 91.20	$ 90.24	$ (0.96)
20	16	5/8"	$ 121.60	$ 120.32	$ (1.28)
50	40	1"	$ 304.00	$ 300.80	$ (3.20)
200	160	2"	$ 1,216.00	$ 1,203.20	$ (12.80)
500	400	3"	$ 3,040.00	$ 3,008.00	$ (32.00)
1,000	800	4"	$ 6,080.00	$ 6,016.00	$ (64.00)
2,000	N/A	6"	$ 12,160.00	$ 15,040.00	$ 2,880.00

Table 8: Water and Sewer Combined Customer Impacts (Quarterly Bill Comparison)

Ccf	Size	Current	Preliminary	$ Change	Preliminary (w/ income discount)	$ Change (w/ income discount)
3	5/8"	$ 35.98	$ 44.88	$ 8.90	$ 33.00	$ (2.98)
6	5/8"	$ 70.96	$ 77.11	$ 6.15	$ 66.00	$ (4.96)
9	5/8"	$ 105.94	$ 109.35	$ 3.41	$ 99.00	$ (6.94)
12	5/8"	$ 140.92	$ 141.59	$ 0.67	$ 132.00	$ (8.92)
15	5/8"	$ 175.90	$ 173.83	$ (2.07)	$ 165.00	$ (10.90)
20	5/8"	$ 234.20	$ 233.46	$ (0.74)	$ 225.90	$ (8.30)
50	1"	$ 584.75	$ 619.08	$ 34.33	N/A	N/A
200	2"	$ 2,337.00	$ 2,522.66	$ 185.66	N/A	N/A
500	3"	$ 5,840.00	$ 6,243.49	$ 403.49	N/A	N/A
1,000	4"	$ 11,675.00	$ 12,423.82	$ 748.82	N/A	N/A
2,000	6"	$ 23,350.00	$ 27,855.62	$ 4,505.62	N/A	N/A

Conclusion

If the City should implement the aforementioned rates, structures, and components, the City should continue to, on an annual basis, determine the effectiveness of each of the rate elements in achieving the desired results and objectives outlined at the start of this Study. The City should also continue to proactively address its financial plan and spending needs over the next five years in order to create and sustain a program of rate increases, fund balances, and debt issuances that will not only adequately recover all costs and ensure financial viability for the City's water and sewer utilities, but also provide the least rate volatility and increases as possible on its customer base. The City should utilize the spreadsheet model prepared by RFC/W-A during the course of the Study in order to complete short- and long-term financial planning. This model allows the City to monitor and revise, as necessary, expenses, customer characteristics, rates, revenue, reserve fund balances, and customer impacts.